Commission for
Communications Regulation

Guidelines

Revised Guidelines to Applicants for Radio Links - Point-to-Point

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Document Revision History

Document Version	Date	Nature of Revision
98/14R6	6 October 2008	General revision
98/14R5	28 December 2007	Opening of 80 GHz band and modifications to 1.3GHz, 1.4 GHz, and 2 GHz bands
98/14R4	26 September 2007	General revision to previous guidelines
98/14R3	December 2002	Revision 3 of Original Document

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Contents

1 Introduction

The licensing of radio link systems is governed by the Wireless Telegraphy (Radio Link Licence) Regulations, Statutory Instruments No. 319 of 1992 ("the Regulations"). The Regulations define a Point to Point (P-P) Radio Link as "a radio link between two stations located at fixed points".

This document sets out the Commission for Communications Regulation's (ComReg) revised guidelines for applicants wishing to apply for a **Point to Point (P-P) radio link licence.** This document replaces the previous guidelines which were issued in December 2007, namely ComReg Document 98/14R5: "Guidelines for Point to Point Radio Link Licences in Spectrum above 1 GHz." (revised December 2007).

The purpose of these guidelines is to provide information on ComReg's Radio Link licensing scheme such that an applicant is in a position to apply for a licence. Among other things, these guidelines provide information on:

- The frequency bands available;
- The technical licensing requirements;
- The application process; and
- The licence itself.

As changes occur in the market on an ongoing basis, it is necessary for ComReg to update its guidelines from time to time. Since 2002 radio link usage in Ireland has almost doubled and there are an increasing number of users requesting radio link licences as a way of providing dedicated high bandwidth connections between two points.

The revisions to these guidelines have therefore focused on streamlining the radio link licensing process and providing greater clarity to the applicant on the radio link licensing process.

ComReg encourages all potential applicants to read these guidelines carefully if they are considering the submission of a radio link licence application to ComReg. Queries regarding these guidelines or on the licensing process can be directed to ComReg's Licensing Operations Team: via telephone to 01 8049600, or via e-mail to licensing@comreg.ie .

ComReg may revise these guidelines again in the future.

2 Statutory Regulations

A Wireless Telegraphy Licence is required under Section 3 of the Wireless Telegraphy Act 1926 to keep and operate apparatus for wireless telegraphy.

The specific regulations governing the issue of Radio Link licences are contained in the Regulations. Please note that these Regulations should be read in light of the Common Regulatory Framework for Electronic Communications Networks and Services, and in conjunction with Appendix F of ComReg document 03/84.

The applicant should be aware that any Radio Link licence granted by ComReg is for the keeping and operation of the apparatus for wireless telegraphy specified in the licence. Any licence issued by ComReg does not free the licensee from complying with any other statutory obligations (e.g. planning permission).

Radio link licensees must also comply with ComReg's General Authorisation scheme governed by the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2003 (S.I. 306 of 2003). See ComReg documents 03/81, 03/82R, 03/83 and 03/102 for more information on the General Authorisation scheme.

3 General Information

A Point to Point Radio Link is defined in the Regulations as “a radio link between two stations located at fixed points”.

Radio Links are commonly used for providing high bandwidth connections between two fixed points and in some circumstances radio links provide an economic alternative to optical fibre and leased lines. There are a large variety of radio link users in Ireland including fixed and mobile operators, broadcasters, public utilities and the emergency services. Generally these licensees use radio links to provide connections between two points in their network.

As shown in Figure 1 below, the use of radio links in Ireland has increased over the past number of years, and as of the 30th June 2008, there were 9335 Point to Point Radio Link Licences in Ireland. This represents a 360% increase in the number of radio links since the year 2000.

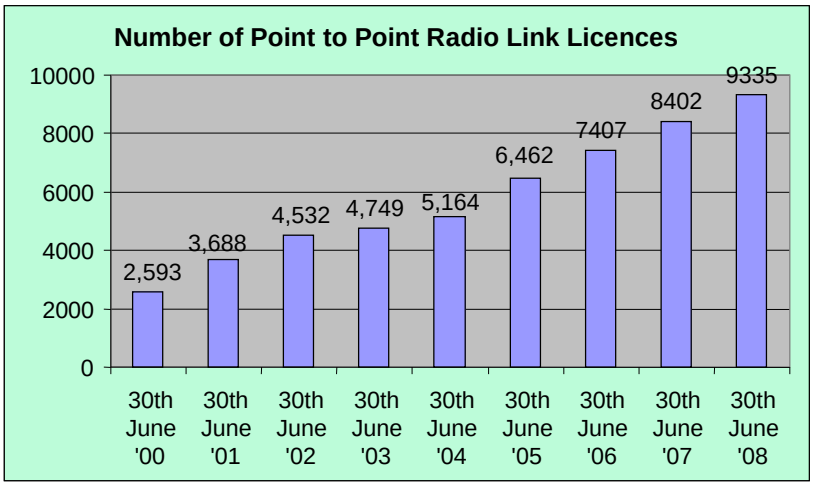

Figure 1: Number of Point to Point Link Licences

3.1 Point to Point (P-P) Frequency Spectrum Bands

ComReg has reserved a number of frequency bands for point to point radio link licensing. These bands are based upon internationally recommended band plans.

Table 5 in Annex 1 of this document sets out the full list of P-P radio link frequency bands available in Ireland and the technical information associated with each band. A summary of the P-P radio link frequency bands in Ireland is set out in Table 1 below.

Table 1: Summary of P-P Radio Link Frequency Bands Ireland

Status	Frequency Bands (GHz)
Open	Lower 6, Upper 6, 7, Lower 8, Upper 8, 11, 13, 15 18, 23, 26, 38, 58, 80
Open and under review	1.3, 1.4 and 2

ComReg may be required to make changes to the P-P Radio Link frequency bands available in Ireland and/or their technical conditions. Such changes may arise for a number of reasons, including:

- Changes in spectrum allocations in accordance with the requirements of international treaties or regionally negotiated agreements;
- Changes necessitated by EU legislation;
- Changes in order to meet national requirements;
- Changes in the interest of efficient use of spectrum.

Arising from any such changes, existing licensees may be required to modify or cease their radio link operations in order comply with the revised frequency bands and technical conditions. ComReg will endeavour to provide as much notice as possible to existing licensees in the event that any such changes are required.

3.2 Preferential Frequency Channels

When considering applications for new radio links, the key criteria that ComReg will take into consideration are:

1. The **spectrum efficiency and optimisation** of the radio link / network, and
2. The **current and future availability** of radio spectrum.

Where the applicant satisfies these criteria and when appropriate[1], ComReg may identify one or more preferred frequency channel(s) for the applicant.

If a preferred frequency channel is identified, the applicant/licensee will endeavour to use this channel to the maximum extent possible in accordance with all relevant licence conditions for

[1] For example, the licensee is a large scale user of radio links and is using radio links in a spectrum efficient manner.

any radio links to be deployed, and ComReg will endeavour to facilitate these applications where possible.

It should be noted that a preferred channel does not mean that the licensee has exclusive use of that frequency channel, as ComReg may license other applicants on the same frequency channel. Exclusive use of a frequency channel can only be obtained via a spectrum competition for a block allocation of spectrum.

3.3 R&TTE Equipment Compliance

In common with other licensed radio services, all radio equipment used to provide radio link services must comply with the Radio and Telecommunications Terminal Equipment Directive 1999/5/EC ("the R&TTE Directive") which was enacted into Irish law on the 5th of June 2001 by Statutory Instrument 240 of 2001[2]. Harmonised standards under the R&TTE Directive, published by the European Telecommunications Standards Institute (ETSI) and CENELEC, can be used to demonstrate compliance to the essential requirements of the R&TTE Directive[3].

In relation to radio services in Ireland, ComReg has set out its R&TTE interface requirements in ComReg Document 06/47R[4]. This document outlines both the mandatory and information interface requirements for point to point radio links in Ireland.

Licensees are advised to familiarise themselves with ComReg Document 06/47R, as it is the responsibility of the licensee to ensure that all equipment being used is R&TTE compliant.

3.4 Cross-Border Radio Links

It is possible to submit an application for a Cross-Border Radio link (i.e. a radio link which spans both sides of the Republic of Ireland/Northern Ireland border). ComReg can facilitate the licensing of that part of the link which operates up to the border, while Ofcom licenses that part of the link which operates on the Northern Ireland side of the border.

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[2] European Communities (Radio Equipment and Telecommunications Terminal Equipment) Regulations, 2001 (S.I. No. 240 of 2001) http://www.irishstatutebook.ie/2001/en/si/0240.html

[3] A list of the harmonised standards under the R&TTE Directive is maintained at http://europa.eu.int/comm/enterprise/newapproach/standardization/harmstds/reflist/radiotte.html

[4] "Interface Requirements for Radio Services in Ireland" http://www.comreg.ie/_fileupload/publications/ComReg0647R.pdf
Note: This document is subject to revision and updates.

4 Technical Licensing Requirements

The Communications Regulation Act 2002 sets out a number of objectives for ComReg, which includes the promotion of competition and ensuring the efficient management and use of the radio spectrum in Ireland. To meet these objectives, ComReg has defined a number of minimum technical requirements that must be met when applying for a radio link. This chapter outlines these requirements.

4.1 General link planning

In the interests of efficient use of the radio spectrum ComReg does not permit the use of frequency diversity or the assignment of separate frequencies for standby purposes, except in the most exceptional of circumstances.

Licensees are encouraged to use radio network resilience techniques to improve the reliability of transmission networks. Such techniques include:

- space diversity;
- 'hot-standby' radio equipment redundancy based on one frequency channel; and
- routing diversity, which involves the construction of networks with ring or mesh architectures.

The following practices are discouraged as they can result in poor spectrum efficiency and excessive interference to other users or services:

- use of unnecessarily high transmit powers;
- inadequate network planning;
- lack of network resilience; and
- excessive use of star networks requiring a number of frequency channels.

4.2 Link Length planning

In the interests of efficient and orderly use of spectrum, ComReg operates a link length policy. The policy specifies the minimum link length permissible for a frequency band and transmission capacity. Details of minimum link lengths per frequency band are contained in Table 5 of Annex 1 of this document.

It is only in the most exceptional of circumstances (e.g. High/Low conflicts), or in circumstances where the optimal use of the spectrum demands, that ComReg will consider licensing a radio link with a path length which is less than the specified minimum link length.

4.3 Radio Frequency Channel

In allocating frequency bands for radio link usage, ComReg uses internationally recommended band plans, where these exist. Only frequency bands and channels as per Table 5 in Annex 1 of this document can be requested for licensing.

In exceptional circumstances, (e.g. Outside Broadcast), it may be necessary for ComReg to grant a link licence in bands other than those listed in Table 5.

4.4 Equipment Requirements

ComReg will only licence radio equipment that meets the minimum mandatory technical requirements as set out in Table 5 in Annex 1 of this document.

The minimum equipment requirements relate to the:

- Transmission Capacity Requirement;
- Minimum Antenna Requirement; and
- Mandatory Equipment Class.

It should be noted that ComReg is unlikely to issue licences for analogue radio links, as analogue radio links are generally less spectrally efficient than digital links, and that only in exceptional circumstances will such links be licensed.

4.5 Requested radio propagation availability & power

ComReg aims to licence a radio link in the most appropriate frequency band with an assigned bandwidth and transmitter EIRP (Equivalent Isotropic Radiated Power) that are the minimum consistent with capacity and availability requirements for that link.

In submitting an application to ComReg, applicants should request the minimum transmitter EIRP (Equivalent Isotropic Radiated Power) that is required for the propagation availability and capacity of the link. Additionally, applicants should ensure that their radio link meets the necessary requirements for the radio propagation availability level requested, as set out in Annex 2.

To determine the minimum transmitter EIRP (i.e. maximum permissible transmitted power) for a radio link, the applicant should carry out a path calculation (link budget).

This path calculation should be based on the same technical parameters as used by ComReg (see Table 2) and take account of the transmitter output power levels, antenna gains, feeder losses and receiver sensitivity levels (referenced to a bit error rate of 1x10-6). Applicants are required to submit this path calculation with their applications.

Additionally, it should be noted that applicants are required to manage any internal interference issues on the same channel, as ComReg only carries out an inter-operator interference checks in its path calculations.

4.6 High / Low database

When planning a radio link, applicants must have regard to the compatibility of the radio link with other existing radio users at the same general location. Specific sites and the immediate surrounding area may be designated "transmit high" or "transmit low" in specific frequency bands, depending on the sub-band in which existing links on that site are transmitting.

Prior to submitting a Point-to-Point Radio Link application, applicants should consult the high / low database on ComReg's website[5] to ensure that their application does not have a high/low designation conflict.

A high / low designation conflict arises when site designation in the application conflicts with the existing site designation in ComReg's database. For example, a High designation is requested in the application for a site that has an existing Low designation.

ComReg will not license a link with a high / low designation conflict.

In consulting the high / low database, applicants should enter accurate site co-ordinates which are based upon measurements taken from a GPS device at the specific mast location. Inaccurate site co-ordinates may lead to licence invalidation.

4.7 Equipment Reference databases

ComReg maintains three separate equipment reference databases which are available on ComReg's website[6]:

- Antenna Reference Codes
- Radio Transmitter Reference Codes
- Feeder Reference Codes

Before submitting an application to ComReg for a Point-to-Point Radio Link licence above 1 GHz, the specifications of the equipment have to be registered on ComReg's Equipment Reference Code Database.

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[5] http://www.comreg.ie/licences/high_low_database.600.highlow.html

[6] http://www.comreg.ie/licences/equipment_reference_codes.601.erc.html

If the equipment is not registered on the database, please complete the Equipment Reference Code Registration Form[7] and send this to ComReg at refcode@comreg.ie .

Please note that ComReg will not accept Point to Point Radio Link applications without a relevant ComReg Equipment Reference Code.

4.8 Link Application File (*.anx)

To facilitate speed of processing for licensing it is a requirement that a Link Application File (*.anx file) be submitted with the application.

The *.anx file must be sent electronically as a text file to links.anx@comreg.ie and appended in hard copy format to the application form itself.

Further information is available on the ComReg website [8]

[7] "Point to Point Radio Links Equipment Reference Code Registration Form" ComReg Document 07/36 http://www.comreg.ie/_fileupload/publications/ComReg0736.pdf

[8] http://www.comreg.ie/licences/application_file_-_anx.616.html

5 Before Applying for a Licence

There are many technical parameters that need to be considered when planning a radio link or a network of radio links. The following guidance relates to the most common issues.

5.1 Planning a radio link

The general aim of planning a radio link is to identify the desired site location, frequency band and channel spacing to meet the transmission and availability requirements of the radio link. The following may assist the applicant in this process.

- When planning a radio link or a network of radio links, applicants must ensure optimal radio link spectrum efficiency, and repeat usage of the same frequency channel(s) throughout the network should be maximised.

- Where the applicant already has existing radio link licences, any future applications should be based upon frequency channels already licensed to the applicant.

- When a preferential frequency channel has been identified, the applicant should aim to re-utilise this channel to the maximum extent possible for any planned radio links. Where possible, ComReg will endeavour to facilitate these applications.

- The applicant should check that its desired radio link plan is in compliance with the technical requirements as set out in Table 5 of Annex 1. For example, the radio link plan meets the minimum link length and transmission requirements for the specific frequency band.

- The applicant should check the planned site co-ordinates with reference to ComReg's on-line high/low database[9] to ensure that there are no high / low designation issues. This may eliminate certain site locations in particular frequency bands.

- Applicants should plan their radio link network based on the minimum Equivalent Isotropic Radiated Power (EIRP) necessary to achieve the required availability. Additionally, in order to minimise the risk of interference to others, the most directional antennas possible should be proposed.

- Applicants should engage with their equipment manufacturer to ensure that the desired radio link equipment (i.e. frequency band, transmission capacity etc.) is available, should a radio licence be issued by ComReg.

[9] http://www.comreg.ie/licences/

- The applicant should ensure that there are no internal interference issues on its desired frequency channels, as ComReg does not take internal interference issues into consideration when evaluating a radio link application.

The above process should be repeated in order to refine the initial radio plan. Once applicants have an initial radio plan, they may wish to avail of the free pre-consultation process with ComReg as outlined below.

5.2 ComReg's Pre-Application Consultation Service

ComReg's pre-application consultation service provides applicants with feedback on their radio link plan and on any potential inter-operator interference issues that may arise. This free service can save time and resources for both the applicant and ComReg and can be used to identify frequency channels for use with prospective links.

To avail of this free service, all applicants are asked to consider points 1 to 4 in the application checklist as set out in Annex 3 before contacting ComReg.

Additionally applicants are encouraged to submit a fully completed Link Application File (*.anx file) to ComReg. This will facilitate direct import of the proposed link/link network data onto the ComReg database and therefore enable ComReg to provide a detailed and timely response. The *.anx file should be sent electronically as a text file to licensing@comreg.ie. Further information on completing a *.anx file can be found on the ComReg website[10].

On Request from the applicant, ComReg provides two forms of pre-consultation:

1. **General consultation**

   Prior to application, it is prudent that all new applicants engage with ComReg, particularly those planning the implementation of a radio link network.

   The scope of the consultation would include, inter alia, the following

   - Support and clarification, provided by ComReg, on any element of the radio link licensing process;
   - Provision, by the prospective applicant to ComReg, of complete details for their radio link requirements;
   - Assessment by ComReg of the radio spectrum usage requirements of the applicant, and liaison with the applicant to examine suitable frequency bands/channels that may be appropriate for the applicants requirements;

[10] http://www.comreg.ie/licences/application_file_-_anx.616.html

- For a large scale, spectrally efficient radio link network, ComReg will consider, as required, the identification of one or more preferential frequency channels for the applicant.

2. Specific consultation relating to potential inter-operator interference

This form of consultation is only appropriate when a radio link application is finalised and is ready to be submitted to ComReg.

This is particularly useful if an applicant believes there is a chance of their prospective radio link being unsuccessful due to inter-operator interference.

6 Guidance on ComReg's Assessment Criteria

This section provides guidance to the applicant on the general assessment criteria that ComReg uses to manage the radio spectrum in Ireland for point to point links.

The applicant should consider this guidance in designing its radio link plan and in specifying the technical parameters of its radio link application.

This guidance is divided into two levels:

- ComReg's General Spectrum Management Criteria; and
- Technical Parameters used in ComReg's Radio Link Path Calculations.

6.1 ComReg's General Spectrum Management Criteria

The Communications Regulation Act 2002 sets out a number of objectives for ComReg. These objectives include the promotion of competition and ensuring the efficient management and use of the radio spectrum in Ireland.

When considering applications for new radio links, the general factors that ComReg takes into consideration in order to meet these statutory objectives are:

1. The **spectrum efficiency and optimisation** of the radio link / network, and
2. The **current and future availability** of radio spectrum.

Spectrum efficiency and optimisation generally refers to the transmission usage on the link and the ability to re-use the same spectrum throughout the country. In order to ensure a minimum degree of spectrum efficiency and optimisation, ComReg has set out a number of technical requirements in Chapter 4 of this document that must be met in order to apply for a radio link. Where possible, applicants are encouraged to surpass the minimum requirements, for example, by using the most directional antennas available. Additionally, when assigning a frequency ComReg generally assigns a frequency in the highest frequency band compatible with the proposed use of that link.

The **current and future availability** of radio spectrum generally refers to the ability of ComReg to satisfy both the current and future demand for radio spectrum.

Having due regard to the efficient and optimum use of spectrum, ComReg will endeavour to satisfy the current demand of applicants where possible. However, applicants should be aware that the availability of spectrum depends upon current usage and there are a number of congested areas and frequency bands where it may not be possible to accommodate the applicant's request.

The future availability of spectrum is dependent upon existing use. Where possible ComReg promotes the re-use of existing spectrum by encouraging applicants to base any new radio link applications on their preferential frequency channels or on frequency channels where they already hold an existing licence.

ComReg recognises that radio links have a significant role to play in the roll-out of telecommunications networks, as they can facilitate the development of infrastructure and competition in the provision of telecommunications services, especially in rural areas. However, given existing radio spectrum congestion issues, it is ComReg's general policy that high capacity telecommunications networks should preferably be based upon optical fibre, which ComReg generally regards as the most appropriate medium for high capacity data links. This is especially the case for long haul back-bone transmission networks and in infrastructurally developed areas where access to radio spectrum is already at a congested level.

6.2 Technical Parameters used in ComReg's Radio Link Path Calculations

For every radio link application, a path calculation (link budget) is undertaken by ComReg using the information on the application form and the availability formulae as set out in Table 2 below.

Table 2: Availability formulae used in ComReg's path calculations

Radio Factor	**ITU-R Recommendation**	**Equation No. (or Table/Figure)**
Free Space Loss	P. 525-2, Annex 1	4
Gaseous Absorption	P.676-6	22a-22u, 23a-23d, 24, 25a-25e, 26a & 26b, 27
	P.530-11	1
	P.836-3	Figure 4
Rain Attenuation	P.838-3	1, 2, 3, Table 1
	P.837-4	32mm/hr, Figure 2
	P.841-4	3, 4, 5 with Q1 and Beta user adjustable.
	P.530-11	35, 36, 37, 38
Multipath Fading	P.530-11	4, 5, 6, 8, 13, 15, 16 and for an unknown sized body of water, 18, 19, 20, 21, 22, 23, 24, 30, 31
	P.530-11	5 or 39, 40
	P.453-9	Figure 9 (pl user adjustable)

Based upon the results of this calculation, ComReg will determine frequency channel and transmitter power to be licensed. The licensed transmitter power will be the minimum power

necessary in order for the link to operate to the specified propagation availability criteria (see Annex 2). It should be noted that the licensed channel and transmitter power may be different to those requested in the application form.

To assist ComReg in this process, applicants are required to submit a path calculation in respect of each proposed radio link with their application form. This path calculation should be based on the same technical parameters as used by ComReg in Table 2 above, and take account of the transmitter output power levels, antenna gains, feeder losses[11] and receiver sensitivity levels (referenced to a bit error rate of $1x10^{-6}$).

Additionally, it should be noted that applicants are required to manage any internal interference issues on the same channel, as ComReg only carries out inter-operator interference checks in its path calculations.

[11] In the absence of any information on feeder loss, combiners, etc. ComReg, if appropriate, can assume a maximum of 1.5 dB for all losses between the transmitter output and the antenna port. If equipment redundancy is used but no duplication of antennas is provided, then ComReg can, if appropriate, assume a maximum of 3 dB for insertion losses in the combiner.

7 The Application Process

7.1 Submitting an Application - Terms for submission

All new and amendment applications for a radio link point to point licence above must be made on the appropriate application form - ComReg document 98/15R5.

To submit an application, it is necessary to carry out the following tasks:

1. Prior to submitting an application, it is recommended that applicants have carried out the necessary checks as outlined in Annex 3. This minimises the possibility of the application proving unsuccessful due to technical issues, such as high/low conflicts, inter-operator interference, etc.

2. The application form must be completed in full, in accordance with these guidelines and the information stipulated in the application form.

3. The declaration form in the application form must be signed.

4. The *.anx file must be sent electronically as a text file to links.anx@comreg.ie

Total fees should be enclosed with the application form i.e. the application processing fee (€12 per link) plus the licence fee per link.

Completed signed application forms must be submitted in writing to ComReg, either via post (at address below), fax or as a scanned copy via e-mail.
Please quote **Point to Point Link Application Form** in the e-mail subject field .

Licensing Operations
The Commission for Communications Regulation,
Abbey Court,
Irish Life Centre,
Abbey Street,
Dublin 1.
E-mail: licensing@comreg.ie

7.2 The Evaluation Process

Only applicants that have met the minimum requirements outlined above will be considered for evaluation. Invalid applications will be declined and returned to the applicant.

Unless ComReg indicates otherwise, all valid applications for a radio link licence will be evaluated on a First Come First Served basis, with applications received by ComReg on the same day being treated equally, i.e. evaluated as though they arrived at the same time.

Applicants should note that while ComReg will endeavour to accommodate the needs of the applicant, ComReg cannot guarantee that the application will be licensed or that the application will be licensed with the requested frequency band and channel.

Following conclusion of the evaluation phase, the applicant will be informed of the Commission's decision to grant or refuse a licence. In the event of refusal, the reasons for refusal will be specified.

7.3 Provision of Further Information

ComReg reserves the right to request an applicant to submit further material and documents in addition to the information already provided within such time and within such format as ComReg may stipulate.

7.4 Publication of Licensee Details

ComReg reserves the right to publish information in relation to the licensee and licence details, subject to its own guidelines on the treatment of confidential information. These guidelines – ComReg publication 05/24 – are available on the ComReg website, www.comreg.ie.

7.5 Application Conditions

By participating in this process, the applicant undertakes to accept the terms of this application document, will abide by the rules of the process and that its application is an irrevocable and unconditional offer that will remain valid and binding on the applicant for the period of the evaluation or until such time as the applicant has been awarded or declined a licence, or ComReg has otherwise terminated the application. All expenses incurred by applicants or potential applicants shall be borne by themselves exclusively.

ComReg reserves the right to alter any of conditions of the licensing process. Although every care has been taken in preparing this document and conducting this process, no representation, warranty or undertaking, expressed or implied, in respect of any error or misstatement is or will

be made or given, and no responsibility or liability will be accepted by ComReg or by any of its officers, employees, servants, agents or advisers as to the accuracy or completeness of this document or any other written or oral information made available to any interested party or its advisers concerning this document and any liability howsoever arising (including in respect of this licensing process) is expressly disclaimed. No information contained in this document shall form the basis for any warranty or representation by or term of any contract with ComReg.

ComReg makes no representations and warranties in respect of the viability of the market or accuracy of the contents of this document so that applicants and potential applicants are responsible for their own verification and due diligence. The applicant agrees by accepting any licence which it may be offered that the licensee is responsible for all costs, liabilities and losses derived from the operation or non-operation of the licence or licensed service for whatever cause.

Applicants should note that ComReg is subject to Irish and EU rules on treatment and handling of confidential information, is a 'Public Body' for the purpose of the Freedom of Information Act, 1997 and is bound by this Act in relation to the release of information.

While ComReg endeavours to minimise the potential for interference between users and services, no liability shall accrue to ComReg arising from interference to licensees of radio systems.Licence Information

8 Licence Information

A Radio Link licence granted under the Wireless Telegraphy (Radio Link) Regulations, 1992 (S.I. 319 of 1992) allows the licensee to keep and operate radio apparatus in accordance with these regulations. The following provides guidance on the licence conditions attached to a radio link licence. It should be noted that ComReg reserves the right not to issue a licence.

8.1 Licensee

The Radio Link licensee can be an individual, company or firm. It is the responsibility of the licensee to ensure compliance with the Radio Link licence conditions.

Additionally, it is the responsibility of the licensee to ensure that their licence details with ComReg remain valid and updated. The licensee should inform ComReg of any licence amendments (e.g. change of address) as soon as they occur.

8.2 The Licensed Frequency

A Radio Link licence allows the licensee to install and operate a radio link on a specified frequency band and channel spacing at particular sites. Licensees should be aware that ComReg licenses other users on the same frequency channels, provided that there is minimal interference potential.

A licence does not confer any right of ownership of the frequency spectrum. It allows the assigned frequency channel to be used during the term of the licence in accordance with the conditions of the licence.

8.3 Licence Duration and Renewal

The duration of the licence is one year. At the request of the licensee, ComReg may renew a licence subject to the necessary renewal conditions being met.

In considering a renewal request, ComReg will have regard to whether, *inter alia*:

1. The licence renewal fee is paid in full;
2. The Radio Link system is being operated in accordance with the terms and conditions of the licence;
3. There are changes being considered or implemented to the P-P Radio Link frequency bands available in Ireland and/or their technical conditions. These changes may due to national or international considerations.

As a consequence of any such changes, existing licensees may be required to modify or cease their radio link operations in order to comply with the revised frequency bands and technical

conditions. ComReg will endeavour to provide as much notice as possible to existing licensees in the event that any such changes are required.

8.4 Temporary Licence Duration

The maximum duration of a temporary radio link licence is six (6) months and is non-renewable.

8.5 Amendments to a Licence

It is the responsibility of the licensee to inform ComReg of any licence amendments as soon as they occur.

A licence amendment occurs when the details on the licence are no longer correct and therefore need to be updated, for example, when

- The address of the licensee has changed;
- The technical characteristics of the link need to be changed in order to facilitate an upgrade of equipment etc.

It should be noted that a change in the site co-ordinates of the radio link licence is not an amendment. In such cases, the existing licence will be cancelled and the licensee must apply for a new link with the new site co-ordinates.

Where the technical characteristics of a licence are amended, ComReg will issue an amended licence to the licensee, subject to any fees that may arise due to increased bandwidth usage. An amendment fee is due when the bandwidth category of the link licence changes. See Table 4 for details of amendment fees.

In exceptional circumstances and where appropriate, ComReg may need to make modifications to existing licences. Where this is required, ComReg will endeavour to provide as much notice as possible to the affected licensees in advance.

8.6 Cancellation of a Licence

A licence may be cancelled at the written request of the licensee. There shall be no entitlement to any refund of licence fees in the event of any such cancellation.

8.7 Transfer of a Licence

A licensee may request that a radio link licence be transferred to another party. This request must be made in writing and is subject to the approval of ComReg.

8.8 Revocation of a Licence

ComReg may suspend or revoke a licence where there is serious or repeated non-compliance by the licensee with the conditions of the licence.

8.9 Fees Payable

The fees payable in respect of each link being applied for are:

(a) a €12 processing fee; and
(b) The annual licence fee for the link.
(The fee schedule is detailed in Table 3 below).

8.10 Licence Fee

The annual licence fee for a Point to Point radio link is dependent upon the signal bandwidth of the link, as set out in Table 3 below. This fee, together with the processing fee, should be included with the application.

Table 3: Annual Licence Fee - Point to Point Radio Link

Bandwidth Category	**Signal Bandwidth (B)**	**Annual Licence Fee (€)**
Narrow Band	B <= 50 kHz	**€571.38**
Medium Band	50 kHz < B <= 3.5 MHz	**€761.84**
Wide Band	B > 3.5 MHz	**€952.30**

8.11 Temporary Licence Fee

Fees in respect of temporary links, which may be issued for any period up to a maximum of six months, are calculated on a pro-rata basis using the rates as set out in Table 3 above. This fee, together with the processing fee, should be included with the temporary application.

8.12 Amendment Fee

An amendment fee is due when the bandwidth category of the licence changes due to the amendment. The amendment fee is calculated using the annual licence fee of each radio link bandwidth category, as set out in Table 4 below.

Table 4: Amendment Fee - Point to Point Radio Link

Old Bandwidth Category	New Bandwidth Category	Amendment Fee (€)
Narrow Band (€571.38)	Medium Band (€761.84)	**€190.46**
Narrow Band (€571.38)	Wide Band (€952.30)	**€380.92**
Medium Band (€761.84)	Wide Band (€952.30)	**€190.46**

8.13 International Coordination Obligations

In some cases it may be necessary for ComReg to undertake international coordination and registration procedures, particularly where there is a possibility of interference to/from the terrestrial and/or satellite services of another administration. As this may take some time, radio links are licensed subject to a condition that the licence may have to be amended, or withdrawn, if successful coordination is not achieved. Where changes arising from international coordination are required to be made to a licence, the licensee will be advised of the necessary changes. In this event, all expenses must be borne by the licensee.

8.14 Non-Ionising Radiation

The licensee shall ensure that non-ionising radiation emissions from the radio link apparatus operated by the licensee and from any structure occupied by the radio link apparatus are within the limits specified in the guidelines published by the International Commission for Non-Ionising Radiation Protection (*"ICNIRP"*). Such emissions must comply with any radiation emission standards adopted and published by ICNIRP or its successors, any radiation emission standards of the European Committee for Electro-technical Standards and any other radiation emission standards specified by law.

8.15 Harmful Interference to other licensed users

Licensees are required to adhere to the guidelines in ETSI Technical Report ETR 053, "Radio Site Engineering for Radio Equipment and Systems in the Mobile Service", to minimise the risk of interference between co-sited/adjacent radio systems.

8.16 Technical Conditions

ComReg issues a radio link licence subject to adherence to a number of technical conditions which specify the operating characteristics of the radio link. These technical conditions vary for each radio link licence. The specified technical conditions include:

- Site height above sea level (m) and site co-ordinates;
- Maximum transmitter Power (dBW) and emission designation

- Antenna gain (dBi), beamwidth, height above ground (m) and Polarisation
- Frequency (MHz), CCIR Rec. and Channel

8.17 Commissioning/Site Inspections

ComReg reserves the right to inspect a radio link station at any time to ensure that the system is configured and operating in accordance with the licence conditions. In addition, ComReg may attend the commissioning of sites and may carry out measurements on the system.

8.18 Interference to the radio link

While ComReg endeavours to minimise the potential for interference between users and services, no liability shall accrue to ComReg arising from interference to licensees of radio systems.

Where a licensee experiences interference, it is advisable that they first check that their own equipment is operating to the terms of its licence, i.e. correct output power, frequency etc. and that the interference is not due to its own network.

ComReg deals exclusively with inter-operator interference issues. Users experiencing interference issues caused by their own network must resolve these issue's internally.

In the event that the licensee is satisfied of the above, it is advised to contact the Spectrum Compliance unit within ComReg at compliance@comreg.ie.

Annex 1: Frequency Bands & mandatory technical conditions

Table 5 sets out the necessary technical requirements for submitting a radio link application. Please note that these requirements vary per frequency band.

Table 5: Radio Link Frequency bands above 1GHz, mandatory technical conditions and status

Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
1.3 GHz	1362.5-1375 MHz and 1504.5-1517 MHz	142MHz	CEPT Recommendation T/R 13-01 E, Annex A	0.25 MHz 0.5 MHz 1 MHz	Minimum required to obtain required availability level	n/a	-	Class 2 EN 300 631	Classes 1, 2, 3 (EN 300 630)	Open and under review Band is subject to review by ComReg in next 2 years. Usage and Frequency allocations may change after review
1.4 GHz	1375-1385.5 MHz and 1427-1437.5 MHz	52MHz	CEPT Recommendation T/R 13-01 E, Annex B	0.25 MHz 0.5 MHz 1 MHz	Minimum required to obtain required availability level	n/a	-	Class 2 EN 300 631	Classes 1, 2, 3 (EN 300 630)	Open and under review Band is subject to review by ComReg in next 2 years. Usage and Frequency allocations may change after review
2 GHz	2025 - 2110 MHz and 2200 – 2290 MHz	175MHz	CEPT Recommendation T/R 13-01 E, Annex C	3.5 MHz, 7 MHz, 14 MHz	Minimum required to obtain required availability level	25 km	4Mbit/s	Class 3 EN 300 631	Classes 2, 3 applicable (EN 300 633)	Open and under review Band is subject to review by ComReg in next 2 years. Usage and Frequency allocations may change after review
L6 GHz	5.925 - 6.425 GHz	252.04 MHz	CEPT/ERC/REC 14-01 E, Annex 1	29.65 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open

Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
U6 GHz	6.425 - 7.125 GHz	340 MHz	CEPT/ERC/REC 14-02 E, Annex 1	20 MHz 40 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open
L7	7.125 – 7.425 GHz	154 MHz	CEPT/ECC/REC 02-06 Annex 1	7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open Note: Part of the L7 band (7.125 - 7.425 GHz) may be allocated towards unidirectional links such as ENG/OB
U7 GHz	7.425 – 7.725 GHz	154 MHz	CEPT/ECC/REC 02-06 Annex 1	7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open
L8 GHz	7.725 – 8.275 GHz	311.32 MHz	ITU-R F. 386-6, Annex 1	29.65 MHz	Minimum required to obtain required availability level	25 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open
U8 GHz	8.275 – 8.5 GHz	126 MHz for 3.5 MHz & 7MHz channel spacing and 119MHz for 14MHz channel spacing	ITU-R F. 386-6, Annex 3	3.5 MHz, 7 MHz, 14 MHz	Minimum required to obtain required availability level	25 km	4 Mbit/s	Class 3 EN 300 833	Classes 1, 2, 3 applicable (EN 301 216)	Open
11 GHz	10.7 - 11.7 GHz	490 MHz	CEPT/ERC/REC 12-06 E	40 MHz	Minimum required to obtain required availability level	10 km	140 Mbit/s	Class 3 EN 300 833	n/a	Open

Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
13 GHz	12.75 - 13.25 GHz	266MHz	CEPT/ERC/REC 12-02 E	3.5MHz, 7MHz, 14MHz, 28MHz	Minimum required to obtain required availability level	9 km	4 Mbit/s	Class 3 EN 300 833	Classes 1, 2 applicable (EN 301 128)	Open
15 GHz	14.5 - 15.35 GHz	420MHz	ITU-R F. 636-3	3.5 MHz, 7 MHz, 14 MHz 28 MHz	Minimum required to obtain required availability level	9 km	4 Mbit/s	Class 3 EN 300 833	Classes 1, 2 applicable (EN 301 128)	Open
18 GHz	17.7 - 19.7 GHz	1010MHz	CEPT/ERC/REC 12-03 E, Annex A	27.5 MHz, 55 MHz,	Minimum required to obtain required availability level	• 6 km (<=34Mbit/s) • 0 km (> 34Mbit/s or 34Mbit/s in 14MHz channel spacing)	34 Mbit/s	Class 3 EN 300 833	PDH: Classes 1 & 2 applicable (EN 301 128) SDH Classes 4,5 Applicable (EN 300 430)	Open Note: 55 MHz can only be allocated when spectrum efficiency is justified (i.e. 2 x STM-1 Min requirement)
23 GHz	22.0 - 22.6 GHz and 23.0 – 23.6 GHz	1008MHz	CEPT Recommendation T/R 13-02 E, Annex A	3.5 MHz, 7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	• 3 km (<=34Mbit/s) • 0 km (> 34Mbit/s or 34Mbit/s in 14MHz channel spacing)	4 Mbit/s	Class 3 EN 300 833	Class 2 applicable to PDH. Class 3 applicable to SDH.	Open

Band	Frequency	Transmit / Receive spacing (duplex direction)	Band Plan	Channel Spacing	Maximum Transmit Power	Minimum path length per Link (km)	Minimum Transmission Capacity	Minimum Antenna Requirement	Mandatory Equipment Class	Notes
26 GHz	Part of 24.5 - 26.5 GHz band namely: 25.277 – 25.445 GHz and 26.285 – 26.453 GHz	1008MHz	CEPT/ERC/REC 13-02 E, Annex B	3.5 MHz, 7 MHz, 14 MHz, 28 MHz,	Minimum required to obtain required availability level	• 3 km (<=34Mbit/s) • 0 km (> 34Mbit/s or 34Mbit/s in 14MHz channel spacing)	4 Mbit/s	For Point to Point antennas : EN 302 217-4-2, Class 3 Note for Point to Multipoint antennas: EN 301 215	Class B equipment applicable (PDH and SDH)	Open Note: Other parts of this band may be opened for individual P-P link licensing once the outcome of the 26 GHz Competition is complete.
38 GHz	37 - 39.5 GHz	1260MHz	CEPT Recommendation T/R 12-01 E, Annex	3.5 MHz, 7 MHz, 14 MHz, 28 MHz	Minimum required to obtain required availability level	0 km	4 Mbit/s	Class 3 EN 300 833	Class 2 applicable to PDH. Class 3 applicable to SDH.	Open
58 GHz	57.00 – 59.00	Under Review.	CEPT/ERC/REC 12-09 E, Annex A	50 MHz 100 MHz	Minimum required to obtain required availability level	0 km	Under Review.	Class 3 EN 300 833	Under Review.	Open
80 GHz	71-76 GHz and 81-86 GHz	10 GHz, < 5 GHz.	ECC/REC/(05)07	250 MHz – 4.75 GHz	Minimum required to obtain required availability level	0 km	150 Mbit/s	Minimum Antenna Gain - 43 dBi, as recommended by ETSI Technical Specification TS 102 524	As defined by ETSI technical specification TS 102 524	Open These bands are open for both FDD and TDD systems.

Annex 2: Propagation Availability Requirements

ComReg licenses radio links with different levels of radio propagation availability. There are a number of requirements that must be met in order to be eligible to apply for a particular radio propagation availability category. These are set out in Table 6 below.

Applicants may be able to improve their overall network availability by using network resilience techniques such as hot-standby, space diversity, routing diversity, planned maintenance etc.

Table 6: Application requirements for required Radio Propagation Availability

Target Radio Outage per yea	**Required Radio Propagation Availability**	**Requirements to be met in order to apply for required availability**		
		High capacity links in bands > 3 GHz	**Low Capacity links in bands > 3 GHz**	**Bands < 3 GHz**
Approx. 263 Minutes	99.95%		Meets minimum technical requirements in these guidelines **but** antenna is not compliant with class 3 in ETSI standard EN 300 833 at either site	Meets minimum technical requirements in these guidelines **but** antenna is not compliant with class 3 in ETSI standard EN 300 631 at either site
Approx. 52.6 minutes	99.99%	Meets minimum technical requirements in these guidelines **and** antenna is compliant with at least class 3 in ETSI standard EN 300 833 at both sites	Meets minimum technical requirements in these guidelines **and** antenna is compliant with class 3* in ETSI standard EN 300 833 at both sites	Meets minimum technical requirements in these guidelines **and** antenna is compliant with class 3* in ETSI standard EN 300 631 at both sites
Approx. 26.3 minutes	99.995%	Meets requirements for 99.99% availability **and (1 or 2 or 3)** 1) including equipment resilience at both sites 2) Routing diversity using for e.g. network meshing, rings etc. on radio, fibre or coax or the use if an alternative infrastructure provider. 3) Is site sharing at either mast with another licensee**		
Approx. 5.3 minutes.	99.999%	Meets requirements for 99.995% availability **and (1 or 2)** 1) the applicant is allowing other licensees** to share the mast 2) Is site sharing at both masts with another licensee**		
Approx. 26.3 – 5.3 minutes	99.995% - 99.999%	Meets requirements for 99.995% availability **and** satisfies ComReg that the higher availability of 99.999% is necessary.	Meets requirements for 99.995% availability (or 99.99% in rural areas where there is no shortage of spectrum) **and** satisfies ComReg that the higher availability is necessary.	

* In rare circumstances for example in rural areas where there is no spectrum congestion **and** where there is no alternative means of communication **and** where there is no possibility of providing adequate antenna support **and** where the links are access or low capacity links, the use of Class 2 Antennae may be permitted. However, these may have to be upgraded (at the licensee's own expense) if spectrum problems arise.

** For the purpose of these guidelines, licensee means a licensee of links above 1GHz, an FWA, FWPMA, WDMDS, WAPECS, 3G or GSM licensee.

Annex 3: Application Checklist

Before submitting a Point to Point link application, ComReg advises applicants to complete the checklist below.

For pre-application consultation, the applicant is requested to consider items 1 through to 4 in the table below.

Table 7: Application Checklist

Item	Issue	Confirmed
1.	All data provided for Site co-ordinates is accurately sourced, preferably from GPS readings taken at precise mast locations;	☐
2.	High/Low checks have been carried out at all sites and confirmed,	☐
3.	If applicable, a preferential channel has been requested; N/A ☐	☐
4.	Requested availability level for a specified link is in accordance with the minimum requirements.	☐
5.	The application processing fee is accompanying the application.	☐
6.	The correct licence fee is accompanying the application.	☐
7.	The EIRP requested is the minimum necessary to achieve the required availability;	☐
8.	All radio, antenna and feeder equipment have correct ComReg Reference Codes, which can be obtained from the ComReg equipment reference database[1]	☐
9.	Information contained within the Annex file (.anx) corresponds fully with the hardcopy submission of the engineering report, with particular regard to:	
	• Site Co-ordinates,	☐
	• Equipment Details,	☐
	• Antenna Details,	☐
	• Polarisation,	☐
	• System Losses,	☐
	• Link Capacity,	☐
	• Bandwidth Requested.	☐

Annex 4: List of ComReg P-P Databases and Website addresses

High / Low Database

http://www.comreg.ie/licences/high_low_database.600.highlow.html

Equipment Reference databases

http://www.comreg.ie/licences/equipment_reference_codes.601.erc.html

*.Anx web page

http://www.comreg.ie/licences/applicatioon_file_-_anx.616.html